AMENDMENTS TO THE DRAWINGS/FIGURES

The attached drawing page 1/3 includes a change to Fig. 1. Replacement page 1/3 which includes Fig. 1 replaces original page 1/3. An annotated page showing the change is also attached.

Attachments: Replacement page 1/3 and Annotated Page 1/3.

REMARKS

The applicants appreciate the Examiner's thorough examination of the application and request reexamination and reconsideration of the application in view of the following remarks.

THE OBJECTIONS TO THE SPECIFICATION

The Examiner objects to the specification because of informalities. The Examiner states that on page 3, line 16 "increase" needs to be one word, and that a heading called "Detailed Description of the Drawings" is lacking.

On page 3, line 16 "in crease" is correct as two words so that the entire sentence reads "However, poor damage tolerance as experienced in crease fold, flex fold, hydrostatic drum burst tests, and creep rupture failure tensile tests, has demonstrated the need for higher strength damage tolerant reinforcements with suitable radio frequency (RF) transmission characteristics." A "crease" is a fold line.

With respect to the heading on page 6, the applicants have substituted the heading "Detailed Description of the Invention". See MPEP §601 I.(H). Also, the applicants have amended the first paragraph of the specification.

Accordingly, the applicants request that the Examiner withdraw the objections to the specification.

THE OBJECTIONS TO FIG. 1

The Examiner also objects to Fig. 1 of the drawings. Fig. 1 has been amended to include the legend prior art as required by the Examiner. With respect to items 12b and 12c in Fig. 1, these are referred to on page 6, lines 18-23 of the specification where "fabric sections 12a-12n"

are discussed. Therefore, the applicants' submit that to remove these items from Fig. 1 would make Fig. 1 less clear in light of the specification. Accordingly, the applicants request that the Examiner withdraw this objection to Fig. 1.

THE REJECTIONS UNDER THE JUDICIALLY CREATED DOCTRINE OF OBVIOUSNESS-TYPE DOUBLE PATENTING

The Examiner rejects claims 1-30 provisionally under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of co-pending Application No. 10/621,155. The Examiner states that "[a]lthough the conflicting claims are not identical, they are not patentably distinct from each other because they appear to be obvious variants of one another".

However, a double patenting rejection of the obvious-type is "analogous to [a failure to meet] the nonobviousness requirement of 35 U.S.C. 103" except that the patent principally underlying the double patenting rejection is not considered as prior art. See MPEP §804 II.B.1., quoting *In re Braithwaite*, 379 F.2d 594, 154 USPQ 29 (CCPA 1967).

> Therefore, any analysis employed in an obviousness-type double patenting rejection parallels the guidelines for analysis of a 35 U.S.C. 103 obviousness determination. *In re Braat*, 937 F.2d 589, 19 USPQ2d 1289 (Fed. Cir. 1991); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985).

See MPEP §804 II.B.1.

Under 35 U.S.C. §103, a strong indication of non-obviousness is where the prior art teaches away from the claimed invention.

U.S. Pat. App. Ser. No. 10/621,155 is entitled "Rigid Radome with Polyester-Polyarylate Fibers and a Method of Making Same", and independent claim 1 of that application, for example,

recites:

> A radome or feedome comprising at least one rigid panel including composite material having polyester-polyarylate fibers in a rigid resin matrix. (Emphasis added.)

The present invention claims, *inter alia*, a radome comprising flexible composite fabric material including polyester-polyarylate fibers in a flexible resin matrix material. The claimed structures -- one rigid and one flexible -- are the opposite of one another.

It is clear, therefore, that the rigid radome of U.S. Pat. App. Ser. No. 10/621,155 including polyester-polyarylate fibers in a rigid resin matrix teaches away from the present claimed invention, and thus the claims of the two applications are not obvious variations of one another.

Accordingly, the applicants request that the Examiner withdraw the provisional obviousness-type double patenting rejection of claims 1-30.

THE REJECTIONS UNDER *GREENE* IN VIEW OF *COFFY*

The Examiner also rejects claims 1-30 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,506,269 to *Greene* in view of U.S. Patent No. 5,360,503 to *Coffy*.

The Examiner cites *Greene* as a primary reference to show the teaching of a laminated plastic radome and method of making the same. The Examiner states that *Greene*'s composite comprises at least one rigid panel having additional external layers. The Examiner recognizes that "*Greene* does not specifically suggest the use of polyester-polyacrylate [sic] fibers nor the outer skin layer as PTFE or FEP or PFA". The Examiner cites *Coffy* as a secondary reference, stating that "Coffy teaches reinforced thermoplastic composites used to make high mechanical and physiochemical performance products". The Examiner takes the position that "a skilled

artisan would have found it obvious to employ the polyester-polyarcrylate [sic] fibers of Coffy in the composite of Greene, motivated by the reasoned expectation of optimizing the electrical properties of the composite".

However, by teaching a rigid panel, *Greene* teaches away from the applicants' claimed flexible radome. Also, *Greene* fails to teach or suggest fibers in the radome skin at all, in contrast to the flexible composite fabric material including polyester-polyarylate fibers as claimed by the applicant. Instead of fibers for radome structural support as claimed by the applicant, *Greene* teaches a machined core with air spaces such that that the core posts provide support. For optimum dielectric value for use in the radar range, *Greene* teaches adjusting the percentage of core to air space. The core and skin are bonded together. See e.g. *Greene* Abstract and column 4, lines 17-26 and 42-53, and column 7, lines 36-50. There is no suggestion in *Greene* to make a radome out of flexible composite fabric material including polyester-polyarylate fibers in a flexible resin matrix material as claimed by the applicants.

The secondary reference *Coffy* relates to a fabric which is made exclusively of polyester polyarylate in order to eliminate known problems between the fibers and the matrix caused by use of materials with different natures. See e.g. *Coffy* Abstract and column 1, lines 30-35, column 1, line 65 through column 2, line 9, and column 6, lines 27-39. *Coffy*, however, does not suggest using his fabric to make a radome.

It is also clear that the teachings of *Greene* and *Coffy* are diametrically opposite. For structural support, *Greene* teaches a rigid core, <u>not</u> fiber reinforced material as taught by *Coffy*. To obtain optimum dielectric value for use in the radar frequency range, *Greene* teaches varying the air to core percentage, <u>not</u> the use of a material transparent to electromagnetic waves. To form a radome, *Greene* teaches separate materials (i.e. polycarbonate) held together by other

materials (i.e. polyurethane), not a matrix and not exclusively one material.

Coffy, in turn, fails to teach or suggest that the disclosed fabric can or should be for radomes, why it would be advantageous to do so, and *Coffy* fails to teach or suggest the considerations involved in fabricating a flexible radome: mechanical strength, transmission losses, and the engineering trade-offs between mechanical strength and transmission losses. See, e.g. pp. 2-4 of the applicants' specification. Notably, existing flexible radomes are susceptible to very significant loss of mechanical strength due to creasing and flexing during the manufacturing process and transportation, aging damage due to environmental conditions, as well as stress ruptures or fabric tears when exposed to high loads. A heavier construction, however, increases radio frequency (RF) transmission losses, decreases receiving sensitivity, and thus requires an increase in the transmission power or the size of radar and communication antennae, at a great cost. Consequently, compromises between RF performance, structural integrity, and survivability are required. See e.g. the applicants' specification at page 2, line 16 through page 3, line 9.

Only the applicants' claimed invention solves shortcomings of such existing radomes through the use of a flexible composite fabric radome material having polyester-polyarylate fibers thus providing increased strength and decreased transmission losses. As noted, in contrast *Coffy* fails to teach such considerations or solutions.

Also, the Examiner's reasoning for combining the cited references, namely, that a skilled artisan would have found it obvious to employ the polyester-polyarylate fibers of *Coffy* in the composite of *Greene*: (a) does not overcome the fundamental, antithetical, diametrically opposite nature of the two references; and (b) does not satisfy the requirement that there be some motivation, suggestion or teaching in the references of the desirability of making the specific combination claimed by the applicants, supported by some objective teaching of record. The

Patent Office is required to show motivation to combine references by making specific findings of fact regarding the level of skill in the art, the relationship between the fields of, in this case, radome design and composite material fabric design, and particular features of the prior art references that would motivate one of ordinary skill in the art to combine elements in references from different fields. See, e.g. In re Dembiczak, 175 F.3d 994, 50 USPQ 2d 1614, 1618, abrogated on other grounds, In re Gartside, 203 F.3d 1305, 52 USPQ 2d 1769 (Fed. Cir. 2000).

In this case, it is only by way of the applicants' specification for the claimed invention, using impermissible hindsight, that the references would be combined.

> A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field ... Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one 'to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher'." In re Kotzab, 217 F.3d 1365, 1369, 55 USPQ 2d 1313, 1316 (Fed. Cir. 2000), quoting W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 313 (Fed. Cir. 1983).

To establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. See In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ 2d 1313, 1316 (Fed. Cir. 2000).

The law is further clear that the teaching of the desirability of combining the references must not come from the applicant's invention. "There must be a reason or suggestion in the art for selecting the procedure used, *other* than the knowledge learned from the applicants' disclosure." See In re Dow Chemical Company, 837 F.2d 469,473, 5 USPQ 2d 1529, 1532 (Fed. Cir. 1989) (with emphasis added).

Additionally, the Examiner can satisfy the burden of showing obviousness of the combination *only* by showing some *objective teaching* in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. See In re Sang Su Lee, 277 F.3d 1338, 61 USPQ 2d 1430, 1433-44 (Fed. Cir. 2002).

The Examiner states:

> Green teaches laminated plastic radomes and the method of making the same. Greene['s] composite comprises at least one rigid panel having additional external layers ...
> Coffy teaches reinforced thermoplastic composites used to make high mechanical and physiochemical performance products. In Example 1 (column 6) patentee teaches using VECTRAN fibers (polyester-polyacrylate [sic]) in a rigid matrix material, which has remarkable transparency to electromagnetic waves and thus would be exceptional if used to make radomes ... Therefore a skilled artisan would have found it obvious to employ the polyester-polyacrylate fibers [sic] of Coffy in the composite of Greene, motivated by the reasoned expectation of optimizing the electrical properties of the composite.

This conclusory analysis is against the weight of the evidence. First, to the extent that *Greene* teaches a "rigid panel", with or without *Coffy*'s fibers, *Greene* (and/or the combination of *Greene* and *Coffy*) teaches away from the applicants' claimed invention of a flexible radome.

Second, the reason *Coffy* states his fabric has transparency to electromagnetic waves is because otherwise the fabric, when used in space, aeronautical, avionics, car, nautical, and competition sports fields (see, e.g. *Coffy*, column 1, lines 24-29), would decompose in the presence of UV, visible, and microwave radiation: "... the liquid crystal polymers can be exposed to radiation (UV, visible, microwave) without decomposing and have a higher dielectric strength than flexible chain polymers". See *Coffy* column 3, lines 27-30.

There is simply no suggestion in *Coffy* regarding the use of his fabric in flexible radomes nor is there any discussion in *Coffy* relating to the mechanical strength and survivability considerations involved in flexible radome design. *Coffy* is void of any teaching of flexible radome design to provide sufficient mechanical strength while minimizing transmission (i.e. RF transmission) losses. Thus, those skilled in the art would not read *Coffy* as proposing a suitable fabric for use in radomes as characterized by *Greene* since a) *Greene* teaches a traditional radome skin with rigid panels and without any fibers, and b) *Greene* teaches adjusting the percentage of core material to air to address transmission losses.

Coffy fails to teach those skilled in the art that fibers in the skin of a radome can lower transmission losses. At best, those skilled in the art reading *Coffy* would understand that his fabric does not decompose in the presence of radiation. Although the applicants believe that *Coffy* is incorrect, and that LCPs would indeed decompose upon exposure to UV radiation, it does not change the fact that *Coffy*'s alleged reasons are far from a teaching that the fibers help lower transmission losses in a radome. In short, the Examiner has failed to make out a *prima facie* case of obviousness.

> Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine the references ...
>
> Combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight ...
>
> The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular ... Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence".

See In re Dembiczak, 175 F.3d 994, 50 USPQ 2d 1614, 1617, abrogated on other grounds, In re Gartside, 203 F.3d 1305, 52 USPQ 2d 1769 (Fed. Cir. 2000) with citations and quotations omitted. In Dembiczak, the Federal Circuit reversed the Board's obviousness rejections because there was no evidence in the record of a suggestion, teaching or motivation to combine the prior art references (which included conventional plastic lawn leaf bags, and books describing painting paper bags to look like a jack-o-lantern) to reject the pending claims to an orange trash or leaf bag with facial indicia that when filled has a generally rounded appearance like a pumpkin.

Thus, the applicants' independent claims 1 and 17-19 are clearly in condition for allowance. Claims 2-16 depend directly or indirectly from claim 1. Claims 20-33 depend directly or indirectly from claim 19. Thus, dependent claims 2-16 and 20-33 are also in condition for allowance for at least the foregoing reasons.

Accordingly, the applicants submit that for at least the foregoing reasons, claims 1-30 are in condition for allowance.

With respect to the Examiner's statement that with regard to the method claims there are no real methodical steps recited therefore they have been treated as article claims, the applicants submit that method (independent) claim 19 indeed recites an act or step, namely, combining polyester-polyarylate fibers with a flexible resin matrix material to form a flexible composite fabric material. Also, there is no *per se* objection to claiming a single-step method. See e.g. Ex Parte Kelly & Ford, 173 USPQ (BNA) 743 (Board of Patent Appeals and Interferences 1971).

Accordingly, the applicants request that the Examiner withdraw this statement and recognize the applicants' method claims as such.

CONCLUSION

Each of the Examiner's rejections has been addressed or traversed. Accordingly, it is respectfully submitted that claims 1-30 are in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts at (781) 890-5678.

Respectfully submitted,

Thomas E. Thompkins, Jr.
Reg. No. 47,136

Applicant: Fredberg *et al.*
Title: RADOME WITH POLYESTER-POLYARYLATE FIBERS AND A METHOD OF MAKING SAME
Serial No.: 10/620,884
Docket No.: RAY-132J
Attorney: Iandiorio & Teska

ANNOTATED PAGE 1/3 SHOWING CHANGES

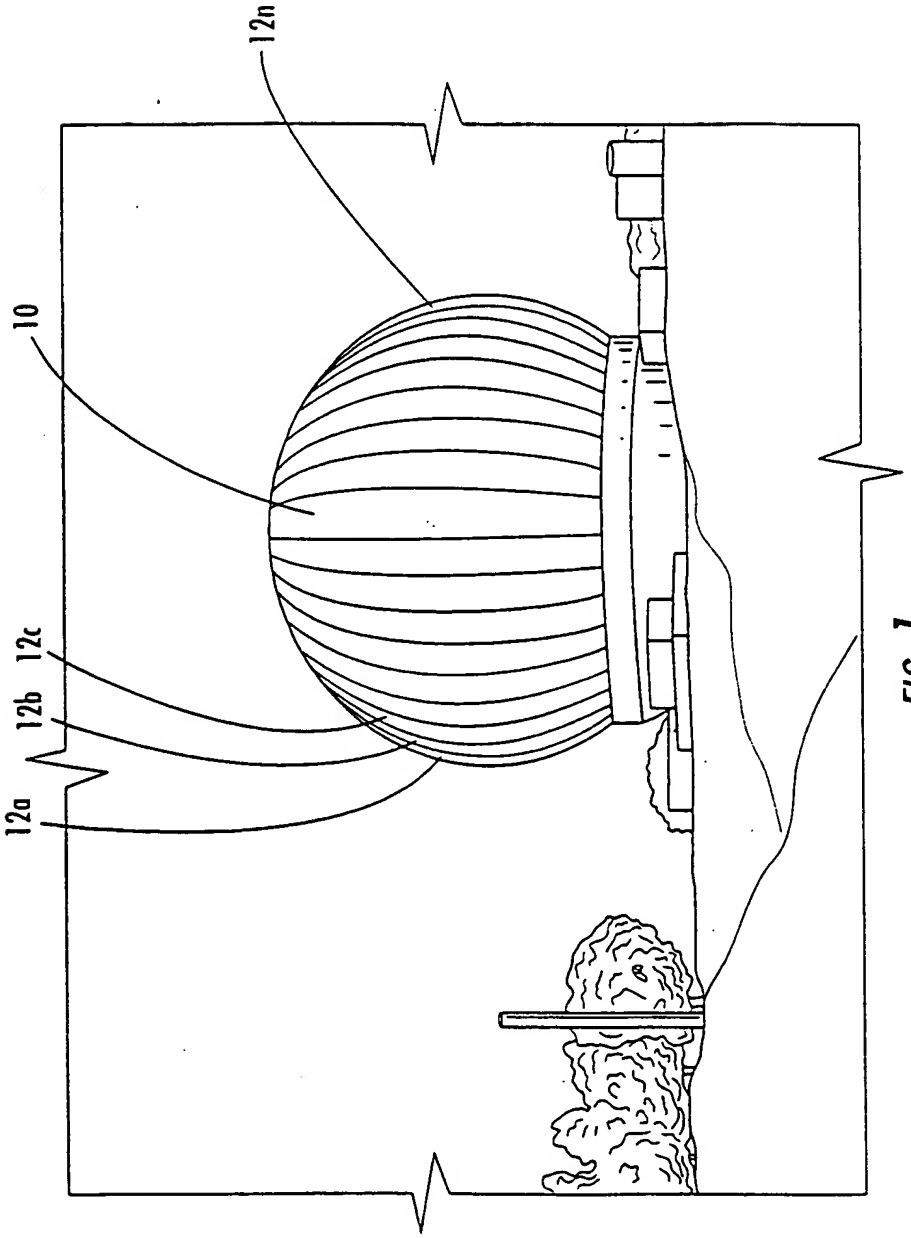

FIG. 1
(PRIOR ART)